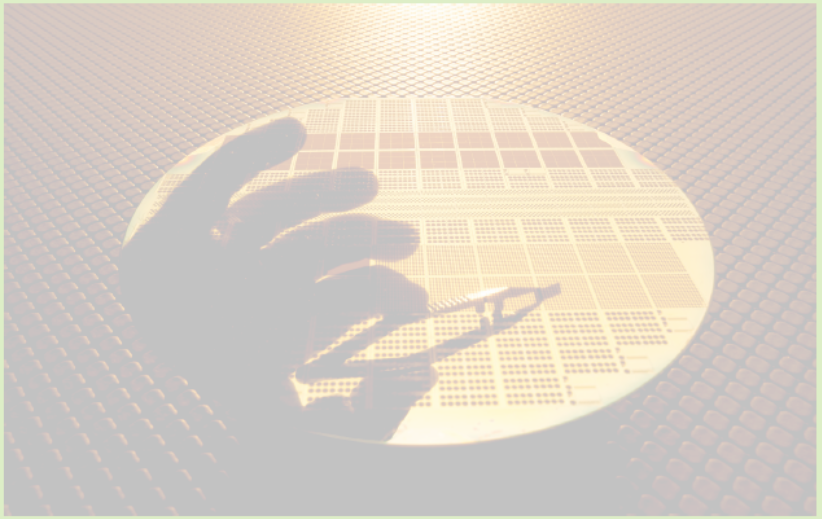
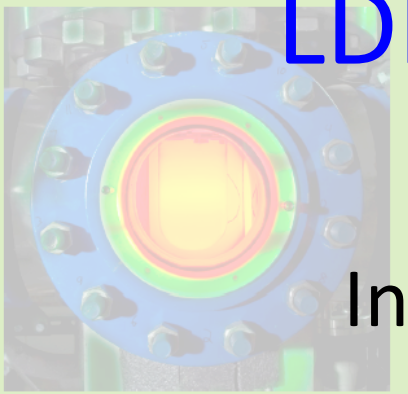
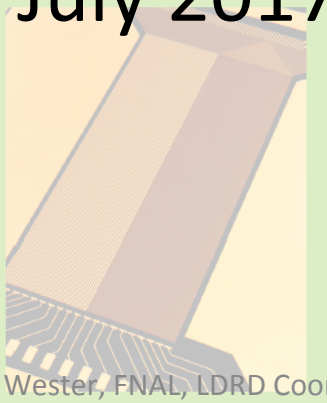








LDRD at Fermilab

Information Session

July 2017

William Wester
LDRD Coordinator

Introduction

- The Department of Energy allows national labs to have and administer a "Laboratory Directed Research and Development," LDRD, Program under DOE Order 413.2C
  - Maintain scientific vitality at the laboratory
  - Novel, cutting edge, demonstration, high risk/high reward projects at the forefront of science and technology.
  - Projects must be outside current programmatic activities and relevant to the missions of FNAL and DOE.
  - Maximum duration is 36 months. For FY18, projects are expected to start Mar 2018.

For Fermilab personnel with great ideas …

LDRD represents a great opportunity to think creatively, to explore a new idea, a new concept, try out a new technique … work at the forefront of science and technology.

While there are requirements and restrictions, the idea is that the process is as little burdensome as possible.

Your role is to be a "Principal Investigator of a LDRD Project"

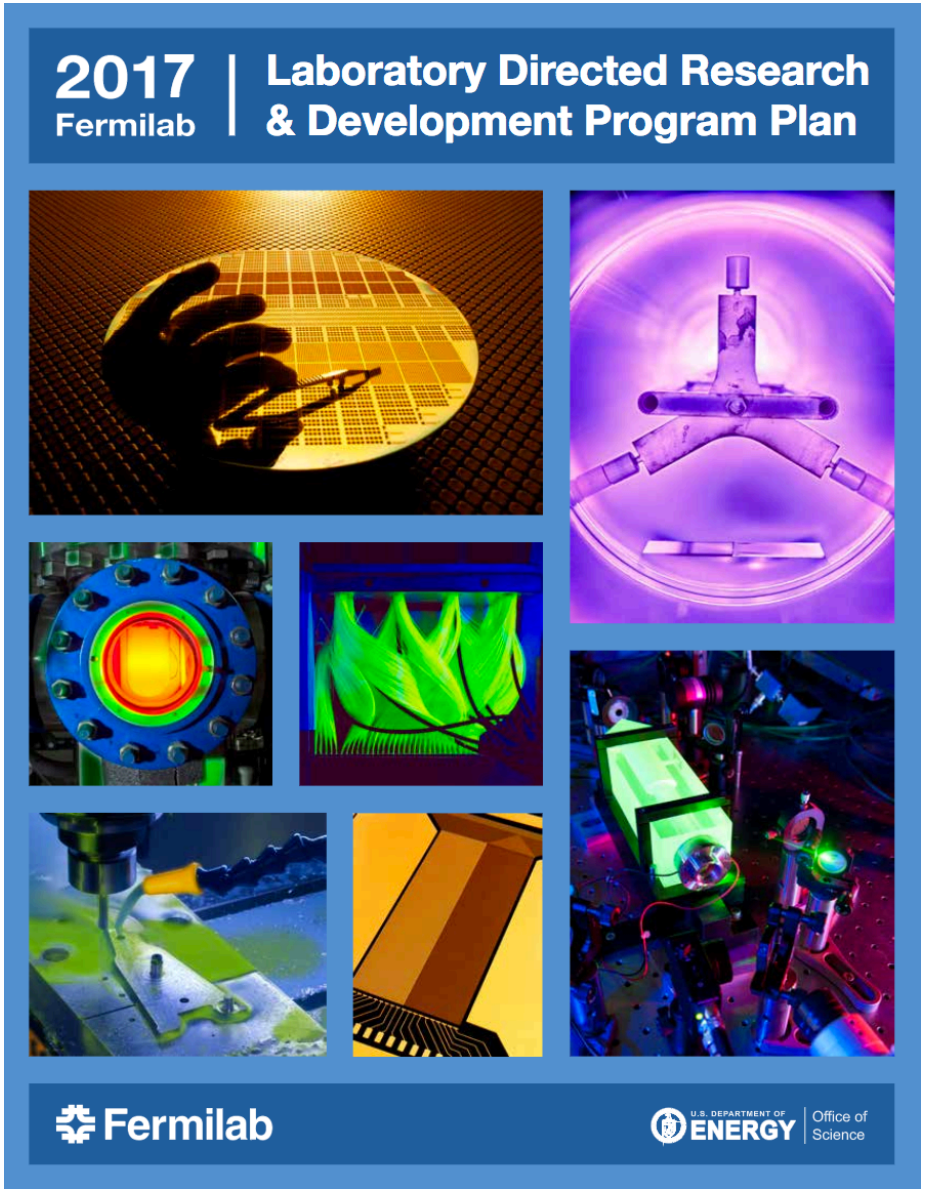
You propose a project, it gets reviewed, ultimately the Laboratory Director approves the project for funding. Your project gets assigned a project / task code and you manage the work plan outlined in your proposal. You obtain results in a deliverable milestone (publication, device, etc.) and complete end-of-project reporting. In some cases, your LDRD will "morph" into programmatic funding or funding from another source [this is considered a success!].

LDRD can also be used to support new strategic areas

LDRD Annual Program Plan

An LDRD Advisory committee has met and developed the implementation procedures for Fermilab's LDRD program. These appear as part of a LDRD Annual Program Plan and a set of documents that describe the process.

The Annual LDRD Program Plan has been approved by DOE as part of the Annual Lab Plan. For FY18, we can spend up to 1.7% of the lab's budget on continuing and new LDRD projects.



LDRD: the money nationally (2016)

Laboratory	Total Lab Certified Cost Base ($M)	LDRD Costs ($M)	LDRD Rate (%)	Projects
Ames Lab	52.2	1.0	1.92%	9
Argonne National Lab	672.2	33.7	5.01%	135
Brookhaven National Lab	471.5	11.5	2.44%	48
Fermi National Accelerator Lab	321.1	3.3	1.03%	19
Idaho National Lab	992.2	17.8	1.79%	71
Los Alamos National Lab	1,948.8	114.3	5.87%	276
L. Berkeley National Lab	682.3	24.6	3.61%	85
L. Livermore National Lab	1,448.6	85.8	5.92%	182
National Renewable Energy Lab	349.8	12.2	3.49%	70
Oak Ridge National Lab	1,204.5	44.2	3.67%	184
Pacific Northwest National Lab	815.5	39.7	4.87%	218
Princeton Plasma Physics Lab	88.1	3.1	3.52%	26
SLAC National Accelerator Lab	228.0	7.0	3.07%	34
Sandia National Lab	2,864.8	159.2	5.56%	366
Savannah River National Lab	182.3	7.5	4.11%	60
Thomas Jefferson National Accelerator Facility	121.9	0.6	0.49%	5
TOTAL LDRD	**12,443.8**	**565.5**	**4.54%**	**1,788**

LDRD at Fermilab
FY14: $1.5M 0.6%, $0.2M actual
FY15: $3.5M 1.0%, $2.2M actual
FY16: $4.5M 1.4%, $3.3M actual
FY17: $4.5M 1.5%
FY18: 1.7%

Actual amount spent (i.e. “LDRD Tax”) recently is about 1%.

Expect FY17 number to be around 1.3% since some FY16 costs were delayed into FY17 and FY18 quantum computing was added by the Directorate.

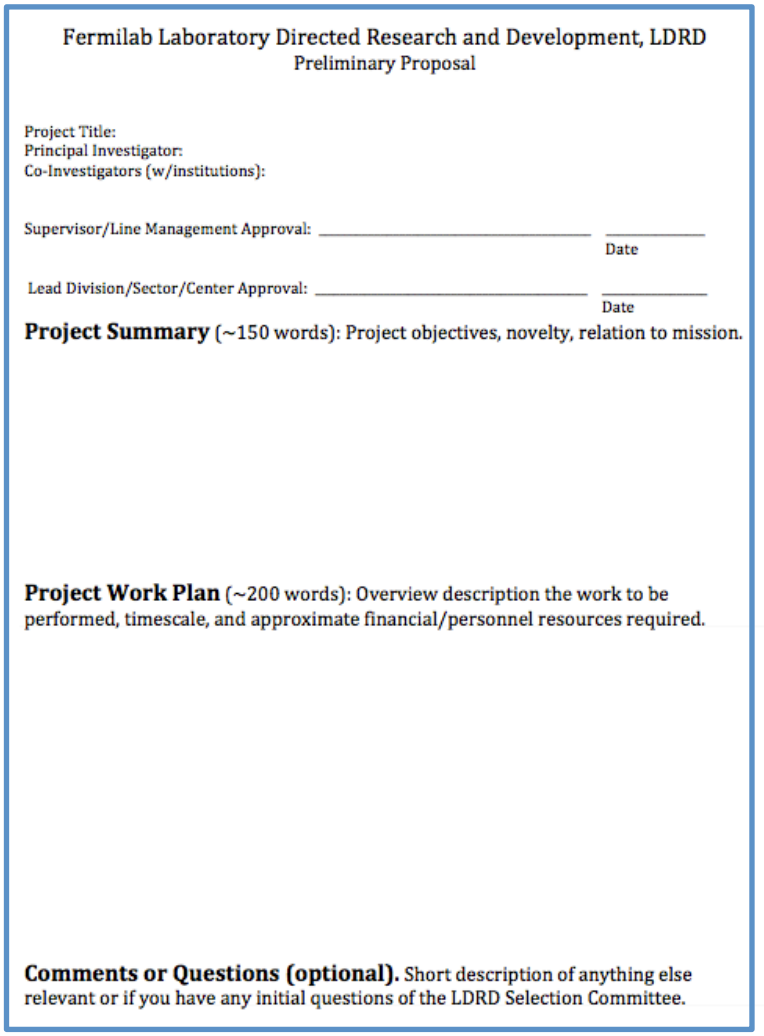
LDRD pays back into the overhead from whence it’s funded.

Call for proposals

1st step: Preliminary Proposal

(due Sep 8 2017 for full consideration)

- Brief description of your project with the scope of the work plan and resources required AND sign-off approval from your Supervisor and Division Head
  - Management is aware of your intentions and believes it can accommodate your requested resources
  - LDRD Selection Committee gets a first look at possible proposals and might suggest changes to be compliant with LDRD requirements



Fermilab Laboratory Directed Research and Development, LDRD
Preliminary Proposal

Project Title:
Principal Investigator:
Co-Investigators (w/institutions):

Supervisor/Line Management Approval: _____ _____
Date

Lead Division/Sector/Center Approval: _____ _____
Date

Project Summary (~150 words): Project objectives, novelty, relation to mission.

Project Work Plan (~200 words): Overview description the work to be performed, timescale, and approximate financial/personnel resources required.

Comments or Questions (optional). Short description of anything else relevant or if you have any initial questions of the LDRD Selection Committee.

Preliminary Proposal Process

- Supervisor / Division have a say in whether there is support for you working on an LDRD project
- The LDRD Selection Committee will review the preliminary proposals and make an initial determination on the relative strength of your proposal. Expect feedback by Sep 22. Full Proposals are due Nov 17 including working with your Division's field financial manager on your proposed budget.
- We expect ~30 Preliminary Proposals (all are very good ideas). Look for feedback to be such to encourage approximately ~15 Full Proposals. We expect to be able to fund 5-7 new projects.

Call for proposals

2nd step: up to ~6 page full proposal

(due Nov 17 for full consideration)

- Summary and full description of your project with a detailed research/work plan and resources required.
  - Emphasize novel nature, relation to Fermilab's/DOE's mission
  - Detailed research plan with key milestones and ending deliverable
- Budget table to be prepared with assistance of Division's Field Financial Manager (FFM).
  - FTE costs for various job categories
  - Overhead rates for various pieces of the proposal

Title
PI (co-I's)
Project Description
Significance
Research Plan
Future Funding
Budget Table
Qualifications (optional)

Full Proposal Process

- All of the members of the LDRD Selection Committee will evaluate each Full Proposal
- In early Dec, each PI of a Full Proposal will make a short presentation to the Selection Committee (no slides) where there is an opportunity to respond to initial questions. Additional questions might follow and require an email response.
- The LDRD Selection Committee will meet and deliberate according to a charge to recommend a list of projects to the Director. We present an ordered list of recommended projects to the Director who makes the final decisions.

Criteria for Evaluating LDRD Proposals

WORKSHEET FOR SCORING LDRD PROPOSAL

Proposal Name and/or ID Number	Principal Investigator's Name

Scoring Criteria	Rating (Check One Per Criteria)					Comments/Notes
	1 = Poor	2 = Fair	3 = Good	4 = Very Good	5 = Excellent	
Scientific/Technical Significance						
Innovativeness/Novelty						
Proposer Qualifications						
Proposal Quality						
Likelihood of Success						
Mission Relevance						
Initiative Relevance						
Strategic Fit						
Enduring Capability						
Laboratory Reputation						

Managing a LDRD Project

LDRD Selection Committee recommends LDRD Projects to the Director for approval subject to DOE Fermi site office concurrence.

Work on the LDRD project may begin when project/task code exists.

The PI is responsible for managing the LDRD project

- Cost effective use of funds
- Adhere to ES&H and Quality Assurance and other Lab policies
- Obtain Division approval of Work Plan (safety concerns addressed, etc.)
- Notify LDRD Coordinator of any changes in scope, other issues
- Prepare mid-year review materials for multi-year projects
- Provide management with periodic status reports
- Protect intellectual property
- Culminate the project in a clear deliverable such as a publication
- Prepare required end-of-project reports

LDRD Projects

- FY14: 50 Preliminary, 26 Full Proposals, 7 funded, 6 completed(*)
- FY15: 34 Preliminary, 10 Full Proposals, 6 funded, 4 completed(*)
- FY16: 34 Preliminary, 15 Full Proposals, 7 funded
- FY17: 37 Preliminary, 15 Full Proposals, 9 funded

* LDRD-2014-010	Brad Benson	Cosmic Microwave Background Detector Development at Fermilab
* LDRD-2014-038	Phil DeMar	Application-Oriented Network Traffic Analysis based on GPUs
* LDRD-2014-028	Juan Estrada	Deployment and operation of a prototype CCD array at Reactor Site for detection of Coherent Neutrino-Nucleus Interaction
* LDRD-2014-027	Sarah Lockwitz	From Magic to Method: Characterizing High Voltage in Liquid Argon TPCs with Breakdown in liquid argon cryostat for high voltage experiments
LDRD-2014-012	Henryk Piekarz	Development of HTS Based Rapid-Cycling Accelerator Magnets
* LDRD-2014-016	Greg Saewert	HF GaN Driver
* LDRD-2014-025	Bob Zwaska	The Sinuous Target
* LDRD-2015-020	Ryan Rivera	Off-the-Shelf Data Acquisition System
* LDRD-2015-029	Sam Posen	Nb_3Sn superconducting RF cavities to reach gradients up to 90MV/m and enable 4.2K operation of accelerators
LDRD-2015-021	Victor Scarpine	Transverse and Longitudinal Profile Diagnostics for H- Beams using Fiber Lasers and Synchronous Detection
* LDRD-2015-010	Marcelle Soares-Santos	Dark Energy Survey and Gravitational Waves
LDRD-2015-031	Alexander Valishev	A comprehensive investigation of a transformational integrable optics storage ring as a "smart" rapid cycling synchrotron for high-intensity beams
* LDRD-2015-009	Michael Wang	High Energy Physics Pattern Recognition with an Automata Processor

LDRD Projects – new for FY16 and 17

Approved FY16 Projects (start Jan 2016)

Prebys	Eric	Beam Precision Time Profile Monitor
Tiffenberg	Javier	Development of an ultra low energy threshold particle detector
Sonnenschein	Andrew	Tuning Axion Detectors with Non-Linear Dielectrics
Wu	Genfa	Novel Methods for High Performance Superconducting Coating on Copper
Paterno	Marc	Preparing HEP reconstruction and analysis software for exascale era computing
Chang	Jin	Implement open source HEP NoSQL database
Chattopadhyay	Swapan	Instrumentation for the Initial set of Critical Scientific Experiments in IOTA and the FAST Injector

Approved FY17 Projects (start Mar 2017)

Estrada	Juan	Optical Microwave Kinetic Inductance Detectors for future cosmic surveys
Niner	Evan	Training Deep Neural Networks for Neutrino Identification in the Cloud
Fava	Angela	LArCADe _ Liquid Argon Charge Amplification Devices
Chou	Aaron	Cryogenic photon sensors for the low mass frontier
Thangaraj	Jayakar	First demonstration of conduction cooled SRF Cavity
Xu	Xingchen	Development of next-generation Nb3Sn superconductors for accelerator magnets
Apresyan/Gray	Artur/Lindsey	Silicon precision timing detectors for minimum ionizing particles
Cancelo	Gustavo	R&D plan to increase the DUNE Photon Detector light efficiency an order of magnitude
Romanenko	Alexander	Quantum Computing using SRF Technology

Two projects (Chou and Romanenko) have quantum computing strategic relevance

LDRD Projects well-distributed across Divisions

- PPD (7.5): Benson, Estrada(x2), Soares-Santos, Tiffenberg, Sonnenshien, Chou, Apresyan(½)
- Neutrino (3): Lockwitz, Niner, Fava
- Accelerator (7): Piekarz, Saewert, Zwaska, Scarpine, Valishev, Prebys, Chattopadhyay
- Technical (4): Posen, Wu, Xu, Romanenko
- Computing (6.5): DeMar, Rivera, Wang, Paterno, Chang, Cancello, Gray(½)
- IARC (1): Thangaraj

- Cross-divisional work enabled (i.e. funding for Soares-Santos includes computer professionals.)
- Director initiated "projects" (Benson, Chattopadhyay, Romanenko)

Summary and then questions

I would like to thank Nigel for being a champion for establishing LDRD at Fermilab. I personally think that there is tremendous potential within the Fermilab staff to do great things. LDRD allows for those great things to get started.

Web site: ldrd.fnal.gov

Please contact
wester@fnal.gov
with any questions

FY2018 deadlines are fast approaching.